

We Claim:

SuMa 1 1. A method for assigning codes in a CDMA wireless communication system in
2 which a plurality of wireless terminals communicate via a plurality of channels, said
3 method comprising the steps of:

4 determining characteristics of said plurality of channels; and

5 assigning codes to said plurality of wireless terminals based on said

6 characteristics of said channels.

1 2. The method of claim 1 wherein said step of assigning codes comprises the
steps of:

3 choosing a target wireless terminal; and

4 assigning a code to said target wireless terminal.

1 3. The method of claim 2 wherein step of assigning a code to a target wireless
2 terminal comprises the step of:

3 performing a random code search to obtain an improved code for said target

4 wireless terminal which is an improvement over a current code of said target wireless
5 terminal.

1 4. The method of claim 3 wherein said step of performing a random code search
2 comprises the step of randomly searching available codes until an improved code is
3 found.

1 5. The method of claim 3 wherein said step of performing a random code search
2 comprises the step of randomly searching a subset of available codes for the best code in
3 said subset.

1 6. The method of claim 3 further comprising the step of:

2 performing a gradient search of codes in the signal space area surrounding said
3 improved code.

1 7. The method of claim 3 further comprising the step of:
2 performing a gradient search of transmission delays for said improved code.

1 8. The method of claim 3 further comprising the steps of:
2 performing a gradient search of codes in the signal space area surrounding said
3 improved code; and
4 performing a gradient search of transmission delays for said improved code.

1 9. The method of claim 1 further comprising the steps of:
2 maintaining a processing set of said plurality of wireless terminals;
3 individually assigning codes to said wireless terminals in said processing set; and
4 adding a wireless terminal to said processing set when said step of individually
5 assigning codes to said wireless terminals in said processing set has converged and
6 repeating said step of individually assigning codes.

1 10. The method of claim 1 further comprising the step of:
2 transmitting said codes to said plurality of wireless terminals.

1 11. A method for assigning a code to a wireless terminal in a CDMA wireless
2 communication system comprising the steps of:
3 determining characteristics of a communication channel of said wireless terminal;
4 and
5 assigning a code to said wireless terminal based on said characteristics of said
6 communication channel.

1 12. The method of claim 11 wherein said step of assigning a code further
2 comprises the step of:

3 performing a random code search for an improved code relative to a current code
4 assigned to said wireless terminal.

1 13. The method of claim 12 wherein said step of performing a random code
2 search comprises the step of:
3 searching available codes for an improved code.

1 14. The method of claim 12 wherein said step of performing a random code
2 search comprises the step of:
3 searching a subset of available codes for the best code in said subset.

1 15. The method of claim 12 further comprising the step of:
2 performing a gradient search of codes in the signal space area surrounding said
3 improved code.

1 16. The method of claim 12 further comprising the step of:
2 performing a gradient search of transmission delays for said improved code.

1 17. The method of claim 12 further comprising the steps of:
2 performing a gradient search of codes in the signal space area surrounding said
3 improved code; and
4 performing a gradient search of transmission delays for said improved code.

1 18. A method for use in a CDMA wireless communication system comprising the
2 steps of:
3 receiving channel characteristics of a plurality of wireless channels; and
4 assigning codes to a plurality of wireless terminals based on said received channel
5 characteristics.

1 19. The method of claim 18 wherein said step of assigning codes comprises the
2 steps of:

3 choosing a target wireless terminal; and
4 assigning a code to said target wireless terminal.

1 20. The method of claim 19 wherein step of assigning a code to a target wireless
2 terminal comprises the step of:

3 performing a random code search to obtain an improved code for said target
4 wireless terminal which is an improvement over a current code of said target wireless
5 terminal.

1 21. The method of claim 20 wherein said step of performing a random code
2 search comprises the step of randomly searching available codes until an improved code
3 is found.

1 22. The method of claim 20 wherein said step of performing a random code
2 search comprises the step of randomly searching a subset of available codes for the best
3 code in said subset.

1 23. The method of claim 20 further comprising the step of:

2 performing a gradient search of codes in the signal space area surrounding said
3 improved code.

1 24. The method of claim 20 further comprising the step of:

2 performing a gradient search of transmission delays for said improved code.

1 25. The method of claim 20 further comprising the steps of:

2 performing a gradient search of codes in the signal space area surrounding said
3 improved code; and

4 performing a gradient search of transmission delays for said improved code.

1 26. The method of claim 18 further comprising the steps of:
2 maintaining a processing set of said plurality of wireless terminals;
3 individually assigning codes to said wireless terminals in said processing set; and
4 adding a wireless terminal to said processing set when said step of individually
5 assigning codes to said wireless terminals in said processing set has converged and
6 repeating said step of individually assigning codes.

1 27. The method of claim 18 further comprising the step of:
2 transmitting said codes to said plurality of wireless terminals.

1 28. Apparatus for communicating with a plurality of wireless terminals via a
2 plurality of channels, said apparatus comprising:
3 a channel estimator for determining channel characteristics; and
4 a code optimizer for assigning codes to said plurality of wireless terminals based
5 on said channel characteristics.

1 29. The apparatus of claim 28 wherein said code optimizer comprises:
2 a memory storing computer program instructions;
3 a processor for executing said stored computer program instructions;
4 said computer program instructions defining the steps of:
5 choosing a target wireless terminal; and
6 assigning a code to said target wireless terminal.

1 30. The apparatus of claim 29 wherein the computer program instructions
2 defining the step of assigning a code to a target wireless terminal further define the step
3 of:

4 performing a random code search to obtain an improved code for said target
5 wireless terminal which is an improvement over a current code of said target wireless
6 terminal.

1 31. The apparatus of claim 30 wherein said computer program instructions
2 defining the step of performing a random code search further define the step of randomly
3 searching available codes until an improved code is found.

1 32. The apparatus of claim 30 wherein said computer program instructions
2 defining the step of performing a random code search further define the step of randomly
3 searching a subset of available codes for the best code in said subset.

1 33. The apparatus of claim 30 wherein said computer program instructions
2 further define the step of:

3 performing a gradient search of codes in the signal space area surrounding said
4 improved code.

1 34. The apparatus of claim 30 wherein said computer program instructions
2 further define the step of:

3 performing a gradient search of transmission delays for said improved code.

1 35. The apparatus of claim 30 wherein said computer program instructions
2 further define the steps of:

3 performing a gradient search of codes in the signal space area surrounding said
4 improved code; and

5 performing a gradient search of transmission delays for said improved code.

1 36. The apparatus of claim 28 wherein said computer program instructions
2 further define the steps of:

3 maintaining a processing set of said plurality of wireless terminals;

4 individually assigning codes to said wireless terminals in said processing set; and
5 adding one of said plurality of wireless terminals to said processing set when said
6 step of individually assigning codes to said wireless terminals in said processing set has
7 converged and repeating said step of individually assigning codes.

1 37. The apparatus of claim 28 wherein said computer program instructions
2 further define the step of:
3 transmitting said codes to said plurality of wireless terminals.

1 38. Apparatus for communicating with a plurality of wireless terminals via a
2 plurality of channels, said apparatus comprising:
3 means for determining channel characteristics; and
4 means for assigning codes to said plurality of wireless terminals based on said
5 channel characteristics.

1 39. The apparatus of claim 38 wherein said means for assigning codes comprises:
2 means for choosing a target wireless terminal; and
3 means for assigning a code to said target wireless terminal.

1 40. The apparatus of claim 39 wherein said means for assigning a code to a target
2 wireless terminal comprises:
3 means for performing a random code search to obtain an improved code for said
4 target wireless terminal which is an improvement over a current code of said target
5 wireless terminal.

1 41. The apparatus of claim 40 wherein said means for performing a random code
2 search comprises means for randomly searching available codes until an improved code
3 is found.

1 42. The apparatus of claim 40 wherein said means for performing a random code
2 search comprises means for randomly searching a subset of available codes for the best
3 code in said subset.

1 43. The apparatus of claim 40 further comprising:
2 means for performing a gradient search of codes in the signal space area
3 surrounding said improved code.

1 44. The apparatus of claim 40 further comprising:
2 means for performing a gradient search of transmission delays for said improved
3 code.

1 45. The apparatus of claim 40 further comprising:
2 means for performing a gradient search of codes in the signal space area
3 surrounding said improved code; and
4 means for performing a gradient search of transmission delays for said improved
5 code.

1 46. The apparatus of claim 38 further comprising:
2 means for maintaining a processing set of said plurality of wireless terminals;
3 means for individually assigning codes to said wireless terminals in said
4 processing set;
5 means for adding one of said plurality of wireless terminals to said processing set
6 when said step of individually assigning codes to said wireless terminals in said
7 processing set has converged and repeating said step of individually assigning codes.

1 47. The apparatus of claim 38 further comprising:
2 means for transmitting said codes to said plurality of wireless terminals.